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Minimum length of suspended sediment yield time-series for a proper estimation of spatio-temporal variability of erosion rates in river basins

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Abstract

River suspended sediment yield (R) is one of the proxies of erosion activity and mechanical denudation in river basins, that can vary greatly both in space and time. A number of R-databases have been collected and permitted to reveal regional and global patterns of erosion. One of the main shortcomings of these databases is the high presence of relatively short lime-scries, which influences greatly the reliability of resultant assessments of spatial erosion patterns. It is necessary to determine the minimum time-series length reliable for assessment of suspended sediment yield spatio-temporal variability, erosion rate mapping and theoretical issues. The author's original method was used to analyze long term time-series from 84 hydrological stations over the former USSR and determine the I values of 9.1 ± 1.2 and 7.611.2 years for assessment of spatial and temporal variability oftf, rcspcciivcly. In case of spatial variability of R in small river basins, reliable time series are 10+ years in lowland landscapes and 6-7 years in highlands, for medium and large basins the /-values are 5 and 10 years respectively. Given that the majority of hydrological stations are located in lowlands and low mountains, the author recommends to base regional and global hydrogeomorphological studies on suspended sediment yield time series not shorter than 10-11 years.

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Keywords

Erosion, Hydrological measurements, Lime-series, River basins, Suspended sedimenl yield

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